

**Electronic Assembly With Filled No-Flow Underfill
and Methods of Manufacture**

5

Abstract of the Disclosure

High yield, high reliability, flip-chip integrated circuit (IC) packages are achieved utilizing a combination of heat and pressure to bond flip-chip die and to
10 cure no-flow underfill material. The underfill comprises a filler or low coefficient of thermal expansion (CTE) material to decrease CTE of the cured underfill. The filler material can be selected from the group comprising silica, silicon oxide, silicon dioxide, silicon nitride, aluminum oxide, aluminum nitride, or a mixture thereof. The filler material may also increase the viscosity of the uncured underfill and/or
15 increase the modulus of elasticity of the cured underfill. In some method embodiments, a thermocompression bonder is used to simultaneously provide solder bump reflow and underfill curing. Application of various methods to a component package, an electronic assembly, and an electronic system are also described.

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